

# Probiotic Soy Milk: A Call to Action



IN A RECENTLY published clinical trial, Ghiasvand R *et al*<sup>1</sup> have shown that the 8-week consumption of 200 mL/day probiotic soy milk fortified with *Lactobacillus plantarum* A7 may exert favorable changes on biomarkers of oxidative stress in patients with type 2 diabetes and concomitant diabetic kidney disease (DKD).

Previous evidences highlighted the close relationship between gut bacteria and oxidative stress and the potential application of probiotic supplementation in individuals with diabetes.<sup>2,3</sup> It has been indeed pointed out that these patients are characterized by low counts of some beneficial gut microbes such as the obligate anaerobes bacteria Lactobacillaceae and Bifidobacteriaceae.<sup>4</sup> Since the contribution of human gut microbiota appears to be linked to increased levels of inflammatory markers and mediators, there is supporting rationale at restoring the regular gut microbiota by administering probiotics enriched with anaerobes bacteria<sup>5</sup> (e.g., *Lactobacillus rhamnosus* and *Enterococcus faecium*). This, in turn, would exert anti-inflammatory effects and ameliorate dysbiosis through microRNAs modulation (e.g., upregulation of miR-423-5p and miR-155).<sup>5</sup> The antioxidative and anti-inflammatory role of probiotics may also be beneficial in patients with chronic kidney disease, as it would reduce renotoxic bacterial products involved in acute tubular necrosis such as p-cresol and trimethylamine N-oxide.<sup>6</sup>

Ghiasvand R *et al*<sup>1</sup> randomized 48 DKD patients to soy milk or probiotic soy milk, adding a strain of *Lactobacillus plantarum* 7 (KC 3555240 LA7) to pasteurized plain soy milk, to test whether the 8-week consumption of this product exerted favorable changes in the individual profile of oxidative biomarkers including malondialdehyde, 8-iso-prostaglandin F2 $\alpha$  (8-iso-F2 $\alpha$ ), oxidized glutathione (glutathione disulfide), glutathione (GSH), glutathione peroxidase, and glutathione reductase. Although the 2 subgroups had similar baseline levels of these biomarkers, the fortified probiotic soy milk subgroup showed significantly increased levels of GSH, GSH-P, and glutathione reductase and lower levels of glutathione disulfide after 8 weeks of supplementation.

No other significant differences were observed in the other stress biomarkers.

The authors claim that their results, although drawn from a relatively limited sample size, may be clinically relevant to reduce the oxidative stress in patients with DKD. However, it remains to be tested whether these effects may last over time and whether the administered dosage of fortified probiotic soy milk has any impact on glycemic control, either expressed as fasting plasma glucose, hemoglobin A1c, or 2-hour plasma glucose. Since (sub)diabetic hyperglycemia in the context of increased insulin resistance is characterized by a whole-body inflammatory status and increased circulating levels of free radical species, clarification of these aspects would encourage a more extensive use of probiotic LA7 in DKD patients.

Furthermore, a large proportion of patients included in the study appeared to be on diet treatment only and no information is given on the ongoing oral hypoglycemic therapy or on other noninsulin injectable drugs. It would be, however, interesting to explore in larger datasets and with longer follow-up duration, whether the impact of fortified probiotic milk would hold significant or otherwise change depending on the ongoing glucose-lowering treatment. This would be relevant, particularly in light of the advancements in the pharmacologic toolkit accrued over the past decade and currently available for the treatment of diabetes.

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